

FORM PTO-103  
(REV. 11-20-99)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

02576

U.S. APPLICATION NO. (If known, see 37 CFR 1.5

10/009429

INTERNATIONAL APPLICATION NO.

PCT/EP00/03955

INTERNATIONAL FILING DATE

03 May 2000 (3.05.00)

PRIORITY DATE CLAIMED

04 May 1999 (4.05.99)

TITLE OF INVENTION SEALING DISC AND FILM COMPOSITE FOR A CLOSURE OF A CONTAINER

APPLICANT(S) FOR DO/EO/US TROMBACH, Horst, et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☐ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
  - a. ☐ is attached hereto (required only if not communicated by the International Bureau).
  - b. ☒ has been communicated by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
  - a. ☒ is attached hereto.
  - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
  - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
  - b. ☐ have been communicated by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
14. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
15. ☒ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☐ Other items or information:

Acknowledgment Postcard  
Comparison Copy of Specification

U.S. APPLICATION NO. (if known, see 37 CFR 1.53) <b>10/009429</b>				INTERNATIONAL APPLICATION NO. <b>PCT/EP00/03955</b>		ATTORNEY'S DOCKET NUMBER <b>02576</b>																															
21. <input checked="" type="checkbox"/> The following fees are submitted: <b>BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):</b> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a) (2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ..... <b>\$1000.00</b>  International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ..... <b>\$860.00</b>  International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... <b>\$710.00</b>  International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... <b>\$690.00</b> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) ..... <b>\$100.00</b> <b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>						<b>CALCULATIONS PTO USE ONLY</b>																															
Surcharge of <b>\$130.00</b> for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).						\$ 890.00																															
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:15%;">CLAIMS</th> <th style="width:15%;">NUMBER FILED</th> <th style="width:15%;">NUMBER EXTRA</th> <th style="width:15%;">RATE</th> <th style="width:15%;">\$</th> <th style="width:15%;"></th> </tr> </thead> <tbody> <tr> <td>Total claims</td> <td>22 -20 =</td> <td>2</td> <td>x \$18.00</td> <td>\$ 36.00</td> <td></td> </tr> <tr> <td>Independent claims</td> <td>4 -3 =</td> <td>1</td> <td>x \$80.00</td> <td>\$ 84.00</td> <td></td> </tr> <tr> <td colspan="4">MULTIPLE DEPENDENT CLAIM(S) (if applicable)</td> <td>+ \$270.00</td> <td>\$ 0.00</td> </tr> <tr> <td colspan="4" style="text-align: right;"><b>TOTAL OF ABOVE CALCULATIONS =</b></td> <td>\$ 1,010.00</td> <td></td> </tr> </tbody> </table>						CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	\$		Total claims	22 -20 =	2	x \$18.00	\$ 36.00		Independent claims	4 -3 =	1	x \$80.00	\$ 84.00		MULTIPLE DEPENDENT CLAIM(S) (if applicable)				+ \$270.00	\$ 0.00	<b>TOTAL OF ABOVE CALCULATIONS =</b>				\$ 1,010.00		\$ 0.00	
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<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.						\$ 505.00																															
<b>SUBTOTAL =</b>						\$ 505.00																															
Processing fee of <b>\$130.00</b> for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).						\$																															
<b>TOTAL NATIONAL FEE =</b>						\$ 505.00																															
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). <b>\$40.00</b> per property +						\$ 0.00																															
<b>TOTAL FEES ENCLOSED =</b>						\$ 505.00																															
						Amount to be refunded: \$																															
						charged: \$																															
a. <input checked="" type="checkbox"/> A check in the amount of \$ <u>505.00</u> to cover the above fees is enclosed.  b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.  c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>19-0120</u> . A duplicate copy of this sheet is enclosed.  d. <input type="checkbox"/> Fees are to be charged to a credit card. <b>WARNING:</b> Information on this form may become public. <b>Credit card          information should not be included on this form.</b> Provide credit card information and authorization on PTO-2038.																																					
<b>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR          1.137 (a) or (b)) must be filed and granted to restore the application to pending status.</b>																																					
SEND ALL CORRESPONDENCE TO: Michele J. Young Reg. No. 43,299 Salter & Michaelson 321 South Main Street Providence, RI 02903-7128 US																																					
SIGNATURE NAME <b>Michele J. Young</b>						REGISTRATION NUMBER <b>43,299</b>																															

Practitioner's Docket No. 02576

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: TROMBACH, Horst et al.

Application No.: To be assigned

Group No.: To be assigned

Filed: November 5, 2001

Examiner: To be assigned

For: SEALING DISC AND FILM COMPOSITE FOR A CLOSURE OF A CONTAINER

Assistant Commissioner for Patents

Washington, D.C. 20231

EXPRESS MAIL CERTIFICATE

"Express Mail" label number EL 775784907 US

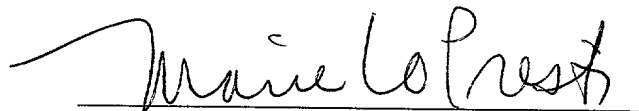
Date of Deposit: November 5, 2001

I hereby state that the following *attached* paper or fee

Express Mail Certificate (1 pg.);  
Application Transmittal (2 pgs.);  
Substitute Specification (10 pgs.);  
Comparison Copy (15 pgs.);  
Formal Drawings (1 sheet/3 Figs./in triplicate);  
Preliminary Amendment (10 pgs.);  
English Translation (12 pgs.);  
and check for \$505.00.

is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. section 1.10, on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

Marie LoPresti



Signature of person mailing paper or fee

EXPRESS MAIL NO. EL 775784907 US

ATTORNEY DOCKET NO. 02576

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: TROMBACH, Horst et al.  
Serial No: To be assigned  
Filed: Filed Concurrently herewith  
**U.S. National Phase of PCT/EP/03955**  
Filed: May 3, 2000  
For: SEALING DISC AND FILM COMPOSITE FOR A CLOSURE OF A  
CONTAINER  
Examiner: To be assigned  
Art Unit: To be assigned

Assistant Commissioner for Patents  
Washington, D.C. 20231

**PRELIMINARY AMENDMENT**

Sir:

Prior to examination of the above-referenced application, Applicants respectfully request entrance of the attached Amendment.

**AMENDMENT**

Please amend the above-identified application as follows:

**In the Specification:**

Please replace the specification with the substitute specification submitted herewith under under 37 C.F.R. § 1.125(b).

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**In the claims:**

Please rewrite the claims as follows:

1. (Amended Once) A film composite for a container closure for use on a container with an opening bounded by a peripheral edge, wherein the film composite consists of a plurality of layers and between the upper-most layer and the layer beneath it there is arranged an adhesive layer at least over a joining surface, wherein the upper-most layer of the film composite comprises an upwardly projecting fold.
2. (Amended Once) The film composite of claim 1, wherein the film composite includes a sealing layer, a middle layer, and a facing layer.
3. (Amended Once) The film composite of claim 1, wherein the fold is arranged off-center.
4. (Amended Once) The film composite of claim 3, wherein the fold divides the surface of the opening of the container into two areas, the smaller of which makes up between 40 percent and less than 50 percent of the surface.
5. (Amended Once) The film composite of claim 1, wherein the fold includes a fold bottom which forms a straight line that passes diagonally through the entire area of the film composite zone arranged on the opening.
6. (Amended Once) The film composite of claim 1, wherein the fold has a constant height from the fold bottom to the fold tip.

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7. (Amended Once) The film composite of claim 1, wherein the fold extends roughly 0.5 to 2 cm from the fold bottom to the fold tip.

8. (Amended Once) The film composite of claim 7, wherein the fold extends roughly 1 to 1.5 cm from the fold bottom to the fold tip.

9. (Amended Once) The film composite of claim 1, wherein the upper layer forming the fold is provided with the adhesive layer in such a way that the adhesive layer also covers the surface area forming the fold.

10. (Amended Once) The film composite of claim 9, wherein the adhesive layer covers the whole area of the under side of the upper layer of the film composite.

11. (Amended Once) The film composite of claim 1, wherein the film composite is slightly greater than the opening extends beyond the peripheral edge.

12. (Amended Once) A sealing disc for a container closure for use on a container with an opening bounded by a peripheral edge, the lower areas of the sealing disc comprise a film composite, comprising a plurality of layers and between the upper-most layer and the layer beneath it there is arranged an adhesive layer at least over a joining surface, wherein the upper-most layer of the film composite comprises an upwardly projecting fold.

Please add the following new claims:

-- 13. (New) A film composite for a container closure for use on a container with an opening bounded by a peripheral edge, comprising:

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an upper layer and a lower layer, each layer extending at least to the peripheral edge of the opening; and

an adhesive layer between the upper layer and the lower layer, the adhesive layer extending at least to the peripheral edge of the upper and lower layers;

wherein the upper layer includes a surface having a surface area, and an engagement device projects upwardly from the surface.

14. (New) The film composite of claim 13, wherein the engagement device is a fold of the upper layer.

15. (New) The film composite of claim 13, wherein the engagement device is a fold of the upper layer and the adhesive layer.

16. (New) The film composite of claim 14, wherein the fold has a base extending between opposing points on the peripheral edge.

17. (New) The film composite of claim 16, wherein the fold includes a fold tip, and the fold has a constant height when measured from the fold base to the fold tip.

18. (New) The film composite of claim 17, wherein the height of the fold is about 0.5 to 2 centimeters.

19. (New) The film composite of claim 17, wherein the height of the fold is about 1 to 1.5 centimeters.

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20. (New) The film composite of claim 13, further comprising a middle layer positioned between the upper layer and the lower layer.

21. (New) The film composite of claim 15, wherein the base of the fold divides the surface into a first region and a second region, the first region having a surface area of between 40 percent and less than 50 percent of the surface area of the upper layer.

22. (New) A sealing disc for a container closure for use on a container with an opening bounded by a peripheral edge, comprising:

an upper layer and a lower layer, each layer extending at least to the peripheral edge of the opening; and

an adhesive layer between the upper layer and the lower layer, the adhesive layer extending at least to the peripheral edge of the upper and lower layers;

wherein the upper layer includes a surface having a surface area, and an engagement device projects upwardly from the surface. - -

#### REMARKS

By present amendment, claims 1-12 were amended solely to place the claims in U.S. format, to use idiomatic English, and to eliminate any multiple dependencies. In addition, claims 13 - 22 were added, with claims 13 and 22 being independent. No new matter has been added.

After entry of this Amendment, claims 1 - 22 will be pending in the application, with claims 1, 12, 13, and 22 being independent.



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Compliance with 37 C.F.R. § 1.125

A substitute specification, excluding claims, under 37 C.F.R. § 1.125(b) is submitted herewith. Applicants state that all amendments to the specification have been made solely to place the specification in U.S. format, including inserting headings and subheadings, correcting spelling, using idiomatic English, and clarifying terms throughout the specification. In accordance with 37 C.F.R. § 1.125(b)(1), Applicants state that the substitute specification does not contain new matter. In accordance with 37 C.F.R. § 1.125(b)(2), Applicants also enclose a marked up copy of the substitute specification showing all the changes to the specification of record.

Applicants state that in view of the amendments and remarks contained herein, the application is in condition for allowance, and a notice to that effect is respectfully requested.

CONCLUSION

In view of the foregoing amendments and remarks, the Applicants respectfully submit that all of the claims pending in the above-identified application are in condition for allowance, and a notice to that effect is earnestly solicited.

If the present application is found by the Examiner not to be in condition for allowance, then the Applicants hereby request a telephone or personal interview to facilitate the resolution of any remaining matters. Applicants' attorney may be contacted by telephone at the number indicated below to schedule such an interview.

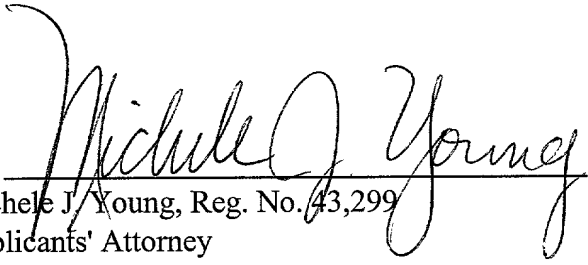
Art Unit:  
Serial No:

To be assigned  
U.S. National Phase of PCT/EP/03955

The U.S. Patent and Trademark Office is authorized to charge any additional fees incurred as a result of the filing hereof or credit any overpayment to our deposit account #19-0120.

Respectfully submitted,  
**TROMBACH, Horst et al., Applicants**

Date: November 5, 2001

By:   
Michele J. Young, Reg. No. 43,299  
Applicants' Attorney  
SALTER & MICHAELSON  
321 South Main Street  
Providence, Rhode Island 02903  
Telephone: 401/421-3141  
Facsimile : 401/861-1953  
Customer No. 000987

Version with marking to show changes to claims

1. (Amended Once) A [F]film composite for a container closure for use on a container [(10)] with an opening [(11)] bounded by a peripheral edge, wherein the film composite [(30)] consists of a plurality of layers and between the upper-most layer [(33)] and the layer [(31)] beneath it there is arranged an adhesive layer [(32)] at least over a joining surface, [characterised in that] wherein the upper-most layer [(33)] of the film composite [(30)] comprises an upwardly projecting fold [(40)].
2. (Amended Once) The [F]film composite [according to] of claim 1, [characterised in that] wherein the film composite [(30)] consists of] includes [at least three layers (31, 33, 34), of which the bottom-most layer (34) is a sealing layer, the middle layer (31) is a layer producing the induction heat and the upper-most layer (33) is the layer facing the user] a sealing layer, a middle layer, and a facing layer.
3. (Amended Once) The [F]film composite [according to] of claim 1[ or 2], [characterised in that] wherein the fold [(40)] is arranged [off-centre] off-center.
4. (Amended Once) The [F]film composite [according to] of claim 3, [characterised in that] wherein the fold [(40)] is so arranged that it] divides the surface of the opening [(11)] of the container [(10)] into two areas, the smaller of which makes up between 40 percent and less than 50[%] percent of the surface.
5. (Amended Once) The [F]film composite [according to one of the preceding claims] of claim 1, [characterised in that] wherein the fold [(40)] possesses] includes a fold bottom [(41)] which forms

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a straight line that passes diagonally through the entire area of the film composite zone arranged on the opening [(41)].

6. (Amended Once) The [F]film composite [according to one of the preceding claims] of claim 1, [characterised in that] wherein the fold [(40)] possesses over its entire length] has a constant height from the fold bottom [(44)] to the fold tip [(42)].

7. (Amended Once) The [F]film composite [according to one of the preceding claims] of claim 1, [characterised in that] wherein the fold [(40)] extends roughly 0.5 to 2 cm from the fold bottom [(41)] to the fold tip (42).

8. (Amended Once) The [F]film composite [according to] of claim 7, [characterised in that] wherein the fold [(40)] extends roughly 1 to 1.5 cm from the fold bottom [(41)] to the fold tip [(42)].

9. (Amended Once) The [F]film composite [according to one of the preceding claims] of claim 1, [characterised in that] wherein the upper layer [(33)] forming the fold [(40)] is provided with the adhesive layer [(32)] in such a way that the adhesive layer [(32)] also covers the surface area forming the fold [(40)].

10. (Amended Once) The [F]film composite [according to] of claim 9, [characterised in that] wherein the adhesive layer [(32)] covers the whole area of the under side of the upper layer [(33)] of the film composite [(30)].

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11. (Amended Once) The [F]film composite [according to one of the preceding claims] of claim 1,  
[characterised in that] wherein the [overall area of the] film composite [(30)] is slightly greater than  
the opening [(11) to be covered including] extends beyond the peripheral edge [(12)].

12. (Amended Once) A [S]sealing disc for a container closure for use on a container with an  
opening bounded by a peripheral edge, [characterised in that] the lower areas of the sealing disc  
[(20)] comprise a film composite [(30) according to one of the preceding claims], comprising a  
plurality of layers and between the upper-most layer and the layer beneath it there is arranged an  
adhesive layer at least over a joining surface, wherein the upper-most layer of the film composite  
comprises an upwardly projecting fold.

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1           The film that seals the container contents is frequently applied by  
2 induction sealing. A complete sealing disc is put on for this purpose, having a  
3 bottom layer that forms the sealing layer. Above the sealing layer lies a second  
4 layer, generally aluminum, which serves for the generation and transmission of  
5 heat during the induction process and optionally forms an additional mechanical  
6 protection. The second layer is firmly connected to the first layer and in particular  
7 favorably for the transmission of heat. Above the second, aluminum layer are  
8 further components of the sealing disc, which remain in the cap after opening the  
9 screw or other rotating closure.

10  
11           The removal of the film is irksome for the user in certain circumstances,  
12 which may require a tool, for example, a knife or a pair of scissors. Use of a tool  
13 leads to the risk that parts of the film will thereby fall into the container contents.  
14 In addition, a suitable tool is not always at hand. Screw closures already exist  
15 with an outside so formed that when used the other way round they permit a  
16 partial cutting or tearing of the film here. This makes the screw cap more  
17 expensive, and it is also necessary to give the user suitable instructions on the  
18 method, so that he may carry out the opening correctly.

19  
20           It has also already been proposed as an alternative, for example in  
21 EP 0 697 345 A2, that the sealing disc, or at least the film composite, be provided  
22 at its edge with suitable projections or tabs, which the user may grasp, thus  
23 allowing the user, supported in this way, to easily remove the sealed-on film. The  
24 extremely practical construction may not be used in every case, however, because  
25 the projecting tabs must, after the positioning of the screw cap, be able to be  
26 arranged between the screw thread and the outside of the container opening, a fact  
27 which may lead to geometrical difficulties. It is also problematical if, for  
28 example, the upper parts of the sealing disc must not exhibit any lugs, because this  
29 prevents their retention in the screw cap part. Two separate punching operations

1 would then have to be provided for the film composite and the upper parts of the  
2 sealing disc, which leads to further costs.

3  
4 It has therefore been proposed in EP 0 395 660 B1 and EP 0 534 949 B1  
5 that the sealed-on film composite be constructed of two layers that are bonded to  
6 one another over roughly half of their area, while the other half remains free. This  
7 results in easy detachment of the half of the upper layer that is not bonded,  
8 whereas the other area remains connected during the detachment. If such a two-  
9 layered, partially bonded film composite is used on the container, the user simply  
10 has to grasp the admittedly flatly positioned but easily detachable half of the upper  
11 layer, and is then able to remove the whole of the film composite by exerting a  
12 suitable force.

13  
14 This rather striking idea nevertheless has some drawbacks. A mass market  
15 product is naturally involved, in which cost considerations play a very great role.  
16 A process must therefore be found in which two layers may be connected to one  
17 another in such a way that they are only partially bonded. This can be brought  
18 about by a relatively laborious strip-wise lamination.

19  
20 A further drawback is due to the partially open upper layer, which causes  
21 problems during the filling and closing of the containers. If the screw closure is  
22 applied with rotation, the latter has a tendency to attack the film by friction. As  
23 the upper layer is supported loosely in part, it is on some occasions also pulled  
24 slightly here, which may lead immediately to uncontrolled creasing and also to  
25 buckling and to destruction. In the container filling industry, however, even  
26 minimal wastage rates are extremely undesirable because, as a rule, the whole  
27 container then has to be rejected or may lead to complaints.



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1           The flatly positioned fold represents, in contrast to the prior art, additional  
2 material and is therefore relatively insensitive. Without an additional punching  
3 operation it does not project, even in the flat lying state, completely up to the edge  
4 side, but ends before the latter.

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6           Particularly preferably, the fold is so arranged that it lies off-center. As a  
7 result, it will have a tendency to tilt in one direction, without its raising being  
8 affected disadvantageously in any way.

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10          In order to simplify the gripping area and the tearing open, the fold should  
11 however remain relatively adjacent to the center, so that a division of the overall  
12 surface is preferred such that the smaller area occupies a zone of 40% to  
13 below 50% of the total area.

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15          It has proved to be particularly practical for grasping if the fold exhibits  
16 a spacing of between 0.5 and 2 cm, in particular between 1 and 1.5 cm, between  
17 the fold bottom directly on the sealing film and the fold tip.

18  
19          It is also preferable if the adhesive layer is provided at any rate in the area  
20 of the upper layer that forms the fold. In this way there will be formed in the zone  
21 a contacting of adhesive layer to adhesive layer within the fold, which increases  
22 and improves the stability and firm bonding of the latter enormously. This has a  
23 corresponding effect on the tearing and tensile strength and also prevents the fold  
24 from bulging or swelling in a roughly oval shape due to external effects.

25  
26          It is particularly preferable, finally, if the adhesive layer occupies the  
27 whole area of the upper layer. This is of advantage in production engineering  
28 terms; the stripwise lamination known from the prior art, with partial provision  
29 and partial omission of an adhesive layer, is especially complicated, in fact, and

1 the full area bonding furthermore also improves the stability and the adhesion of  
2 the entire film composite.

3  
4 Furthermore, it is advantageous if the whole area of the sealing film is  
5 slightly greater than the opening to be covered, including the peripheral edge.

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7 This very slightly projecting amount of material makes it easier to pull the  
8 edge upwardly when grasping the fold. A quite small edge area is created, in fact,  
9 which is not be grasped from behind, but which during the raising of the fold is  
10 on the peripheral edge of the opening of the container without direct adhesion, and  
11 thus favorably influences the tearing process. The projecting edge is on the other  
12 hand of such small proportions that it is significantly smaller than, for example,  
13 the tabs from EP 0 697 345 A2, and in no circumstances comes into contact with  
14 the screw cap.

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16 The foregoing object is achieved in the case of a sealing disc by the fact  
17 that the lower layers of the sealing disc include the film composite according to  
18 one of the above combinations of features.

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20 Such a sealing disc possesses all the above-mentioned advantages. It is  
21 perfectly possible to incorporate the layer forming the fold, together with the fold,  
22 immediately in the production of the sealing disc, and then to use the complete  
23 component in this way in the packaging industry.

#### 24 25 BRIEF DESCRIPTION OF THE DRAWINGS

26 An embodiment of the disclosure will be described in detail below with  
27 reference to the drawings, in which:

28 FIG. 1 shows a diagrammatic perspective view of a container with a first  
29 form of execution of the sealing film;

FIG. 2 is a diagrammatic section through the sealing film from FIG. 1; and  
FIG. 3 is a diagrammatic section through a sealing disc with a sealing film  
of corresponding form of execution from FIG. 2.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A container 10 is filled, for example, with foodstuffs or agrochemicals or  
other oxygen-sensitive goods, in particular with liquid. Container 10 includes an  
opening 11 from which the contents are to be removed at a given time. The  
opening 11 is surrounded by a peripheral edge 12.

Opening 11 is sealed by a film composite 30. Above film composite 30  
is also located a screw cap (not shown), with which, even if film composite 30 is  
destroyed, the container may be sealed at least temporarily. The screw cap also  
serves to protect film composite 30 against mechanical influences from outside.

Film composite 30 includes in particular three film layers and two  
adhesive layers, as shown in FIG. 2. A first or bottom-most layer 34 is in the  
sealed-on state fixed exactly on the peripheral edge 12 of the container 10. On  
first layer 34 is arranged an adhesive layer 35, which connects first layer 34 firmly  
to a second layer 31. Second layer 31 is an induction film, in particular of  
aluminum. If second layer 31 is heated by induction, the heat is transferred to first  
layer 34, thus sealing layer 34 firmly on edge 12.

A further adhesive layer 32 is provided on the second layer 31, which is  
the induction film. Second adhesive layer 32 continuously connects layer 31 to  
upper-most layer 33.

Layer 33 includes a fold 40. Layer 33 is planar outside the area of fold 40  
and is connected to underlying layer 31 continuously by the adhesive layer 32. In

the area of fold 40, the whole of layer 33 is laid double starting from fold bottom 41 and extends like this up to fold tip 42, and from there back again to fold bottom 41. Between the two doubly laid material components of upper layer 33 is also located adhesive layer 32, and preferably likewise two-fold. This can be brought about at the manufacturing stage by upper layer 33 being coated with adhesive layer 32 over its whole surface while still in the unfolded state, and then during the line manufacture being bent onto layer 31 of the induction film with the addition of the fold. Thus, fold 40 is particularly stable, and because of the dual adhesion, also bonded particularly firmly into itself. It may nevertheless have a light and filigree effect, for example, because of the fact that the whole of layer 33 is made of a transparent material.

Fold 40 extends diagonally across the film at right angles to the drawing plane. The distance between fold bottom 41 and fold tip 42 is constant here, optionally with bevels or curves in the edge area. The fold tip therefore forms a substantially straight line.

The effect that the whole of this has can be seen in FIG. 1. The whole of the container mouth or opening 11 of container 10, which mouth or opening 11 is covered by film composite 30, is at the same time provided just off-center with fold 40, which rises upward from fold bottom 41 lying exactly in the plane of opening 11 of container 10. Fold 40 is shown slightly inclined, the reason for which is that it lies completely flat in the packed state, occupies little space in this way, and also offers no opportunity for gripping by the screw cap during the screwing on.

FIG. 3 shows diagrammatically a complete sealing disc 20, of which the film composite 30 with its three film and two adhesive layers 31, 32, 33, 34 and 35 together with fold 40, forms the bottom-most part.

1           The upper portion may be a polyamide layer or another polymer.

2

3           Use is possible for all containers, glass, PET, PAC, PP, PVC. The sealing  
4 layer beneath the aluminum induction film layer 31 is adapted to any material of  
5 the container.

6

7           The end consumer is provided with an outstanding quality, a construction  
8 that can be opened easily by means of the projecting fold, which also opens  
9 reliably and does not tear.

10

11           The filler or packaging manufacturer is presented with the advantage that  
12 such a sealing film or such a sealing disc may be used particularly reliably without  
13 problems during the charging operation having to be anticipated.

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15           The manufacturer of the sealing film is presented with the advantage that  
16 he longer has to carry out strip lamination, but is concerned exclusively with  
17 materials covering a whole area.

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19           The fold 40 is not formed until the punching stage. A suitable tool of a  
20 punching tool is set so that the whole-area material arrives suitably folded.

21

22           What is claimed is:

SEALING DISC AND FILM COMPOSITE FOR A CLOSURE OF A  
CONTAINER

ABSTRACT

A sealing disc and a film composite for a container closure is provided, for use on a container with an opening bounded by a peripheral edge. The film composite includes a plurality of layers. An adhesive layer is arranged at least over a joining surface between the upper layer and the underlying layer.

### Sealing disc and film composite for a closure of a container

The invention relates to a sealing disc and a film composite for a container closure, for use on a container with an opening bounded by a peripheral edge, wherein the film composite consists of a plurality of layers, and between the upper layer and the layer lying beneath it there is arranged an adhesive layer at least over a joining surface.

On the closure of a container it is frequently desirable, or even necessary, to provide the container mouth with a disc-shaped closure which seals off the contents, for example liquids or else substances such as foodstuffs.

There are several reasons why said sealing off is required. On the one hand, the contents are to be protected against outside influences, for example against water vapour or oxygen, on the other they are also to remain aroma-tight. There is a further reason in the case of aggressive contents, for which as optimum a leakage protection as possible must be provided. Finally, an originality protection for the trade may also be provided by such a sealing off, since a user is able to recognise immediately whether someone has already handled the container contents beforehand.

In addition, the container closure is then also sealed with a screw cap or a similar element, which ensures a mechanical and stable sealing outside the film. On initial use the user destroys the film in order to obtain access to the contents of the container and closes the container afterwards (unless he has already removed the entire contents) with the screw closure, which may provide a temporary seal for the opened contents for a suitably short period of time.

The film that seals the container contents is frequently applied by means of induction sealing. A complete sealing disc is put on for this purpose, whose bottom-most layer forms the sealing layer. Above it lies a second layer consisting as a rule of aluminium, which serves for the generation and transmission of heat during the induction process and



optionally forms an additional mechanical protection. The second layer is connected to the first one firmly and in particular favourably for the transmission of heat. Above said aluminium layer are then provided also further components of the sealing disc, which remain in the cap after the opening of the screw or other rotating closure.

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The removal of the film is irksome for the user in certain circumstances. He requires a tool for this, for example a knife or a pair of scissors, which leads to the risk that parts of the film will thereby fall into the container contents. In addition, a suitable tool is not always to hand. There are also already screw closures whose outside is so formed that when used the other way round they permit a partial cutting or tearing of the film here. This makes the screw cap more expensive and it is also necessary to give the user suitable instructions on the method, so that he may carry out the opening correctly.

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It has also already been proposed as an alternative, for example in EP 0 697 345 A2, that the sealing disc, or at least the film composite, be provided at its edge with suitable projections or tabs, which the user may grasp, thus allowing him, supported in this way, to easily remove the sealed-on film. Said extremely practicable construction may not be used in every case, however, since said projecting tabs must after the positioning of the screw cap be able to be arranged between the screw thread and the outside of the container opening, a fact which may lead to geometrical difficulties. It is also problematical if, for example, the upper parts of the sealing disc must not exhibit any lugs, because this prevents their retention in the screw cap part. Two separate punching operations would then have to be provided for the film composite and the upper parts of the sealing disc, which leads to further costs.

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It has therefore been proposed in EP 0 395 660 B1 and EP 0 534 949 B1 that the sealed-on film composite be constructed of two layers that are bonded to one another over roughly half of their area, while the other half remains free. This results in the half of the upper layer that is not bonded being able to be detached easily, whereas the other area remains connected during said detachment. If such a two-layered, partially bonded film composite is used on the container, the user simply has to grasp said admittedly flatly

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positioned but easily detachable half of the upper layer and is then able to remove the whole of the film composite by exerting a suitable force.

This rather striking idea nevertheless has some drawbacks. A mass market product is naturally involved, in which cost considerations play a very great role. A process must therefore be found in which two layers may be connected to one another in such a way that they are only partially bonded. This can be brought about by a relatively laborious strip-wise lamination.

A further drawback consists in the fact that because of the partially open upper layer, problems arise during the filling and closing of the containers. If the screw closure is applied with rotation, the latter has a tendency to attack the film by friction. As the upper layer is supported loosely in part, it is on some occasions also pulled slightly here, which may lead immediately to uncontrolled creasing and also to buckling and to destruction. In the container filling industry, however, even minimal wastage rates are extremely undesirable, since as a rule the whole container then has to be rejected or may lead to complaints.

The object of the invention is therefore to propose a sealing disc and a sealing film for a container closure which also leads to an easy opening of the film for the user, but at the same time is also convenient and reliable in manufacture and does not require additional punching operations.

Said object is achieved in the case of a film composite by the fact that the upper-most of the layers of the film composite comprises an upwardly projecting fold.

There may be exploited first of all with such a fold all the advantages that are also exhibited by ideas, for example, from EP 0 395 660 B1 or EP 0 534 494 B1. It is not necessary to cut open the film composite or to provide tabs projecting over the edge. In the case of a positioned screw cap, the fold naturally lies flat on the top side of the

remaining film composite. It is not bonded with the latter, however, since the outside of the upper layer is here supported on another area of the outside of the upper layer.

5 The user now simply grasps said fold, raises it and then removes the entire film composite with it. In so doing he will as a rule grip one end of the fold and be able at said point to pull the film easily upward vertically, whereby a "rolling away" of the remaining edge is then obtained.

10 Conversely, the drawbacks from the aforementioned prior art are advantageously not encountered. The outer edge of the film composite consists, in fact, of the same, identical formation the whole way round: both the upper and the lower layers are everywhere present. There is therefore no tendency to buckling or creasing.

15 The flatly positioned fold represents, in contrast to the prior art, additional material and is therefore relatively insensitive. Without additional punching operation it does not project, even in the flat lying state, completely up to the edge side, but ends before the latter.

20 Particularly preferably the fold is so arranged that it lies off-centre. As a result, it will have a tendency to tilt in one direction, without its raising being affected disadvantageously in any way.

25 In order to simplify the gripping area and the tearing open, the fold should however remain relatively adjacent to the centre, so that a division of the overall surface is preferred such that the smaller area occupies a zone of 40 to below 50% of the total area.

It has proved to be particularly practical for the grasping if the fold exhibits a spacing of between 0.5 and 2 cm, in particular between 1 and 1.5 cm, between the fold bottom directly on the sealing film and the fold tip.

30 It is also preferable if the adhesive layer is provided at any rate in the area of the upper layer that forms the fold. In this way there will be formed in said zone a contacting of

adhesive layer to adhesive layer within the fold, which increases and improves the stability and firm bonding of the latter enormously, which has a corresponding effect on the tearing and tensile strength and also prevents the fold bulging or swelling in a roughly oval shape due to external effects.

5

It is particularly preferable, finally, if the adhesive layer occupies the whole area of the upper layer. This is of advantage in production engineering terms; the stripwise lamination known from the prior art, with partial provision and partial omission of an adhesive layer, is especially complicated, in fact, and the full area bonding furthermore also improves the stability and the adhesion of the entire film composite.

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Further it is advantageous if the whole area of the sealing film is slightly greater than the opening to be covered, including the peripheral edge.

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This very slightly projecting amount of material makes it easier to pull the edge upwards when grasping the fold. A quite small edge area is created, in fact, which is not be grasped from behind, but which during the raising of the fold is on the peripheral edge of the opening of the container without direct adhesion, and thus favourably influences the tearing process. Said projecting edge is on the other hand of such small proportions that it is significantly smaller than, say, the tabs from EP 0 697 345 A2 and in no circumstances comes into contact with the screw cap.

20

The object is achieved in the case of a sealing disc by the fact that the lower layers of the sealing disc comprise the film composite according to one of the above combinations of features.

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Such a sealing disc possesses all the above-mentioned advantages. It is perfectly possible to incorporate the layer forming the fold, together with said fold, straightaway in the production of the sealing disc, and then to use the complete component in this way in the packaging industry.

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An embodiment of the invention will be described in detail below with reference to the drawing, in which:

Figure 1 shows a diagrammatic perspective view of a container with a first form of execution of the sealing film,

Figure 2 a diagrammatic section through the sealing film from Figure 1 and

Figure 3 a diagrammatic section through a sealing disc with a sealing film of corresponding form of execution from Figure 2.

A container 10 is filled, for example, with foodstuffs or agrochemicals or other oxygen-sensitive goods, in particular with liquid. It possesses an opening 11 from which the contents are to be removed at a given time. The opening 11 is surrounded by a peripheral edge 12.

The opening 11 is sealed by a film composite 30. Above the film composite 30 is also located a screw cap (not shown), with which, even if the film composite 30 is destroyed, the container may be sealed at least temporarily. The screw cap also serves to protect the film composite 30 against mechanical influences from outside.

The film composite 30 possesses in particular three film layers and two adhesive layers. This is clearly distinguishable in Figure 2. The bottom-most layer 34 is in the sealed-on state fixed exactly on the peripheral edge 12 of the container 10. On the first or bottom-most layer 34 is arranged an adhesive layer 35, which connects said first layer 34 firmly to a second layer 31. The second layer 31 is an induction film, in particular of aluminium. If it is heated by induction, said heat is transferred to the bottom-most layer 34 and thus seals the latter firmly on the edge 12.

On said second layer 31, the induction film, is provided a further adhesive layer 32. The second adhesive layer 32 connects said layer 31 to upper-most layer 33 continuously.

The layer 33 comprises a fold 40. The layer 33 is planar outside the area of the fold 40 and connected to the underlying layer 31 continuously by the adhesive layer 32. In the area of the fold 40 the whole of the layer 33 is laid double starting from the fold bottom 41 and extends like this up to the fold tip 42 and from there back again to the fold bottom 41. Between said two doubly laid material components of the upper layer 33 is also located the adhesive layer 32, and preferably likewise two-fold. This can be brought about at the manufacturing stage by the upper layer 33 being coated with the adhesive layer 32 over its whole surface while still in the unfolded state, and then during the line manufacture being bent onto the layer 31 of the induction film with the addition of said fold. The fold 40 is thus particularly stable and because of the dual adhesion also bonded particularly firmly into itself. It may nevertheless have a light and filigree effect, for example because of the fact that the whole of the layer 33 is made of a transparent material.

The fold 40 extends diagonally across the film at right angles to the drawing plane. The distance between fold bottom 41 and fold tip 42 is constant here, optionally with bevels or curves in the edge area. The fold tip therefore forms a substantially straight line.

The effect that the whole of this has can be seen in Figure 1. The whole of the container mouth or opening 11 of the container 10, which mouth or opening 11 is covered by the film composite 30, is at the same time provided just off-centre with the fold 40, which rises upward from the fold bottom 41 lying exactly in the plane of the opening 11 of the container 10. The fold 40 is shown slightly inclined, the reason for which is that it lies completely flat in the packed state, occupies little space in this way, and also offers no opportunity for gripping by the screw cap during the screwing on.

Figure 3 shows diagrammatically a complete sealing disc 20, of which the film composite 30 with its three film and two adhesive layers 31, 32, 33, 34 and 35 together with fold 40 forms the bottom-most part.

The upper portion may be a polyamide layer or another polymer.

Use is possible for all containers, glass, PET, PAC, PP, PVC. The sealing layer beneath the induction film layer 31 consisting of aluminium [is] adapted to any material of the container.

5

The end consumer is provided with an outstanding quality, a construction that can be opened easily by means of the projecting fold, which also opens reliably and does not tear.

10

The filler or packaging manufacturer is presented with the advantage that such a sealing film or such a sealing disc may be used particularly reliably without problems during the charging operation having to be anticipated.

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The manufacturer of the sealing film is presented with the advantage that he longer has to carry out strip lamination, but is concerned exclusively with materials covering a whole area.

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The fold 40 is not formed until the punching stage. A suitable tool of a punching tool is set so that the whole-area material arrives suitably folded.

### List of reference symbols

	10	container
	11	opening
5	12	edge of the opening
	20	sealing disc
	30	film composite
10	31	second layer, induction film layer
	32	second adhesive layer
	33	upper-most layer
	34	bottom-most layer, sealing layer
	35	first adhesive layer
15		
	40	fold
	41	fold bottom
	42	fold tip



## Claims

1. Film composite for a container closure for use on a container (10) with an opening (11) bounded by a peripheral edge, wherein the film composite (30) consists of a plurality of layers and between the upper-most layer (33) and the layer (31) beneath it there is arranged an adhesive layer (32) at least over a joining surface, **characterised in that**

the upper-most layer (33) of the film composite (30) comprises an upwardly projecting fold (40).

2. Film composite according to claim 1,

**characterised in that**

the film composite (30) consists of at least three layers (31, 33, 34), of which the bottom-most layer (34) is a sealing layer, the middle layer (31) is a layer producing the induction heat and the upper-most layer (33) is the layer facing the user.

3. Film composite according to claim 1 or 2,

**characterised in that**

the fold (40) is arranged off-centre.

4. Film composite according to claim 3,

**characterised in that**

the fold (40) is so arranged that it divides the surface of the opening (11) of the container (10) into two areas, the smaller of which makes up between 40 and less than 50% of the surface.

5. Film composite according to one of the preceding claims,

**characterised in that**

the fold (40) possesses a fold bottom (41) which forms a straight line that passes diagonally through the entire area of the film composite zone arranged on the opening (41).

6. Film composite according to one of the preceding claims;

**characterised in that**

the fold (40) possesses over its entire length a constant height from the fold bottom (44) to the fold tip (42).

7. Film composite according to one of the preceding claims,

**characterised in that**

the fold (40) extends roughly 0.5 to 2 cm from the fold bottom (41) to the fold tip (42).

8. Film composite according to claim 7,

**characterised in that**

the fold (40) extends roughly 1 to 1.5 cm from the fold bottom (41) to the fold tip (42).

9. Film composite according to one of the preceding claims,

**characterised in that**

the upper layer (33) forming the fold (40) is provided with the adhesive layer (32) in such a way that the adhesive layer (32) also covers the surface area forming the fold (40).

10. Film composite according to claim 9,

**characterised in that**

the adhesive layer (32) covers the whole area of the under side of the upper layer (33) of the film composite (30).

11. Film composite according to one of the preceding claims,  
**characterised in that**

the overall area of the film composite (30) is slightly greater than the opening (11) to be covered including the peripheral edge (12).

- 5    12.    Sealing disc for a container closure for use on a container with an opening  
          bounded by a peripheral edge,

**characterised in that**

the lower areas of the sealing disc (20) comprise a film composite (30) according to one of the preceding claims.

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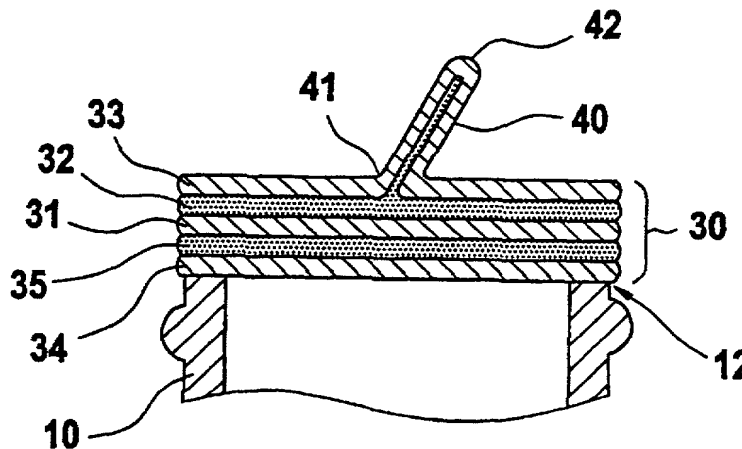
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(57) Abstract

The invention relates to a film composite which serves as a closure for use with a container (10) having an opening (11) that is delimited by a peripheral edge. The film composite (30) is comprised of several layers. An adhesive layer (32) is arranged between both of the top two layers (31, 33) at least over a partial surface. The uppermost layer (33) comprises an upwardly projecting fold (40).

(57) Zusammenfassung

Ein Folienverbund dient für einen Behälterverschluss zur Verwendung bei einem Behälter (10) mit einer durch einen umlaufenden Rand begrenzten Öffnung (11). Der Folienverbund (30) besteht aus mehreren Schichten. Zwischen den beiden obersten Schichten (31, 33) ist mindestens über eine Teilfläche eine Klebschicht (32) angeordnet. Die oberste Schicht (33) weist eine nach oben vorspringende Falte (40) auf.



1 / 1

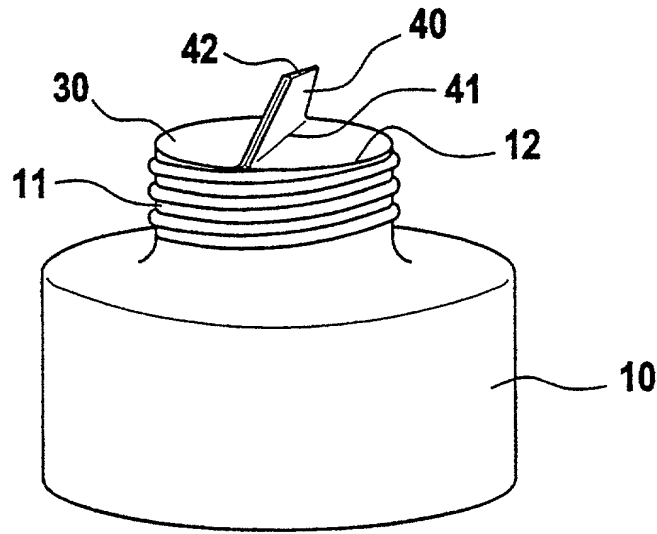


Fig. 1

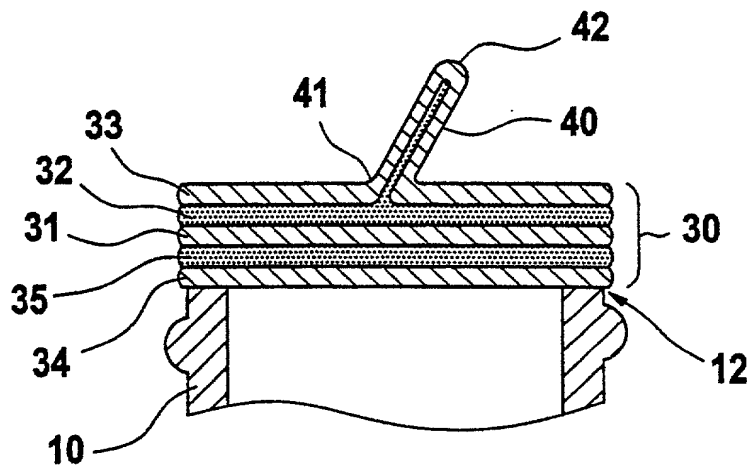


Fig. 2

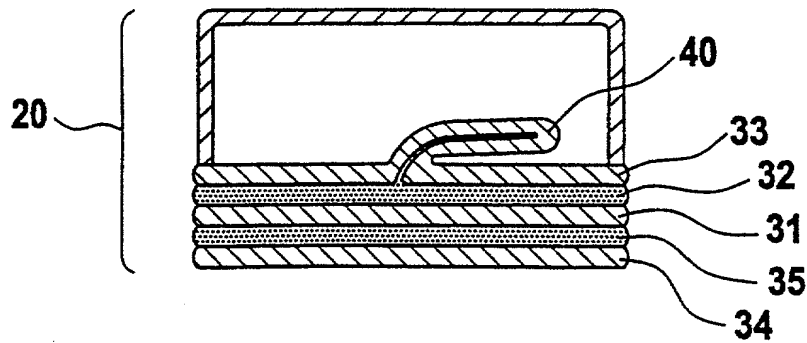


Fig. 3

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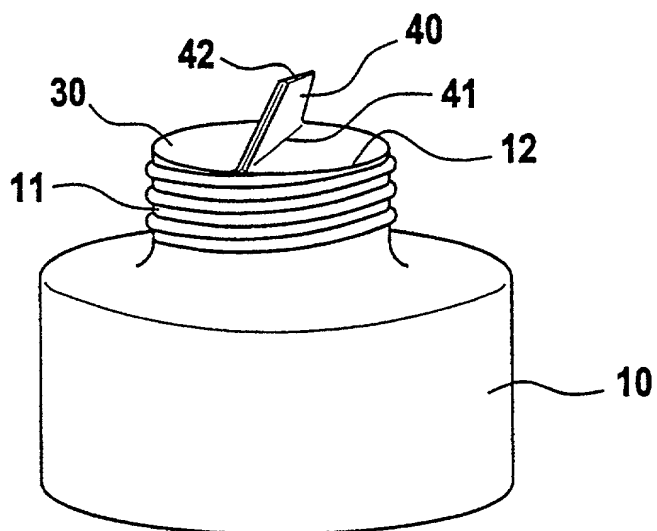


Fig. 1

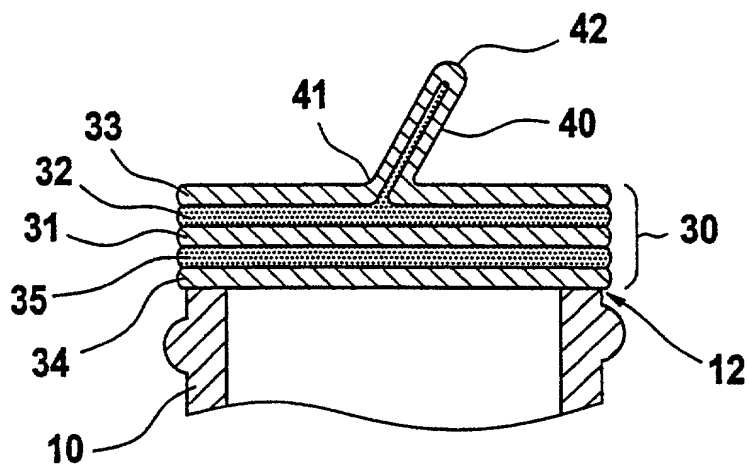


Fig. 2

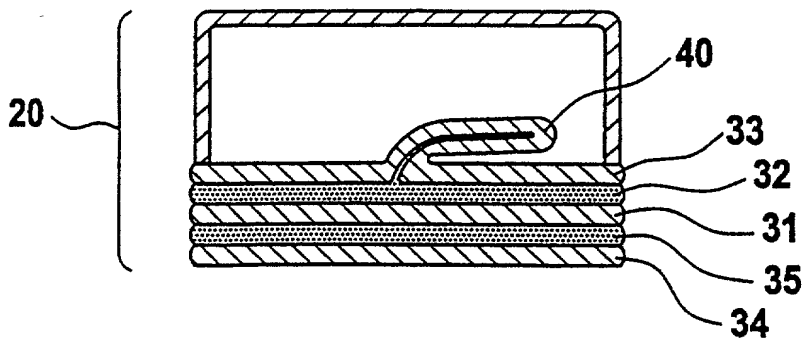


Fig. 3

1 / 1

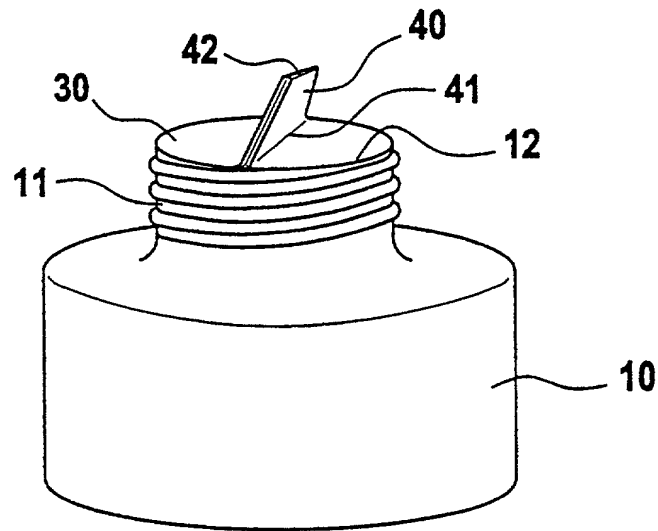


Fig. 1

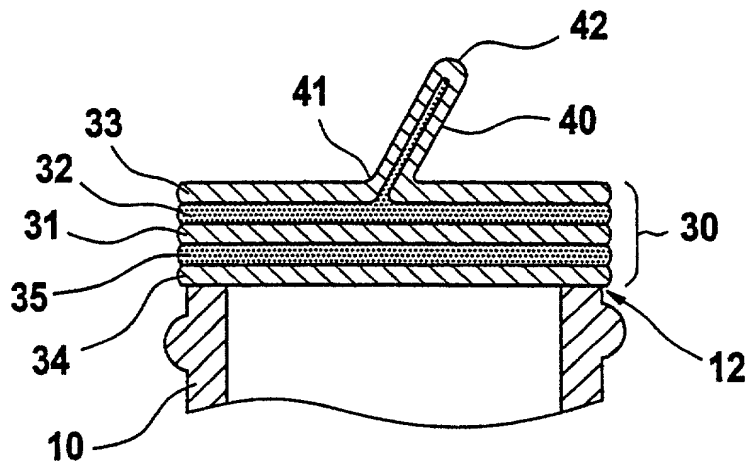


Fig. 2

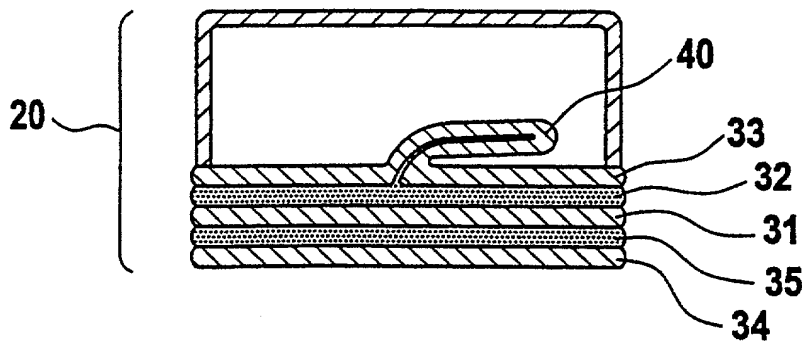


Fig. 3

10 Rept.

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<b>DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION</b> (37 CFR 1.63)	<b>Attorney Docket Number</b>	02576
	<b>First Named Inventor</b>	Trombach, Horst
	<b>COMPLETE IF KNOWN</b>	
	<b>Application Number</b>	10/009,429
	<b>Filing Date</b>	November 5, 2001
	<b>Group Art Unit</b>	
<input type="checkbox"/> Declaration Submitted with Initial Filing	<b>OR</b>	<input checked="" type="checkbox"/> Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)
<b>Examiner Name</b>		To be assigned

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**SEALING DISC AND FILM COMPOSITE FOR A CLOSURE OF A CONTAINER**

the specification of which (Title of the Invention)

☐ is attached hereto  
OR  
☒ was filed on (MM/DD/YYYY) 05/03/00 as United States Application Number or PCT International

Application Number PCT/EP00/03955 and was amended on (MM/DD/YYYY) (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 356(b) of any foreign application(s) for patent or inventor's certificate, or 356(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
199 20 586.8	DE	05/04/1999	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)

☐ Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

[Page 1 of 2]

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## DECLARATION — Utility or Design Patent Application

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)

☐ Additional U.S. or PCT international application numbers are listed on a supplemental priority data sheet PTO/SB/02C attached hereto.

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

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☐ Additional registered practitioner(s) named on supplemental Registered Practitioner Information sheet PTO/SB/02C attached hereto.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor:	<input type="checkbox"/> A petition has been filed for this unsigned inventor						
Given Name (first and middle (if any))	Family Name or Surname						
Horst	Trombach						
Inventor's Signature	<i>Horst Trombach</i>		Date	12/31/02			
Residence: City	Bremen	State		Country	Germany	Citizenship	Germany
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City	Bremen	State		ZIP	D-28757	Country	Germany

☒ Additional inventors are being named on the 1 supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto

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## DECLARATION

**ADDITIONAL INVENTOR(S)**  
**Supplemental Sheet**  
Page 1 of 1

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